

Challenges for Transitioning Science Research to Space Weather Applications

James Spann, NASA/MSFC

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J9.2, January 8, 2013

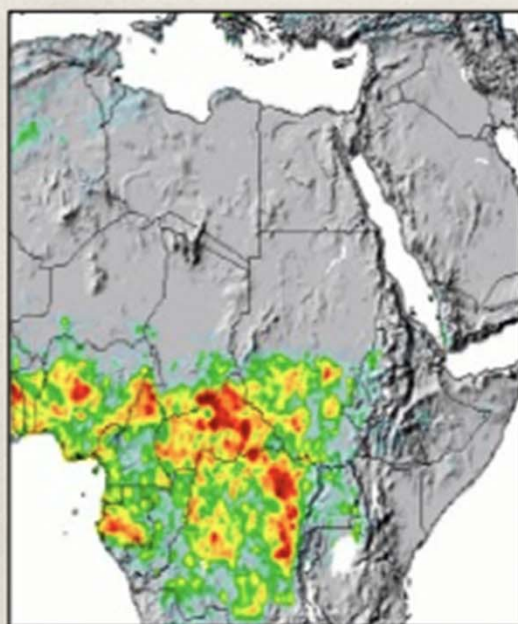
- ❖ Two examples
- ❖ Commitment
- ❖ Culture
- ❖ Clarity
- ❖ Cycle
- ❖ Check
- ❖ Conclusions



- ❖ SERVIR—the Regional Visualization and Monitoring System—helps government officials, managers, scientists, researchers, students, and the general public make decisions by providing Earth observations and predictive models based on data from orbiting satellites.
- ❖ The SERVIR system helps nations in Mesoamerica, East Africa, and the Himalayan regions cope with eight areas of societal benefit identified by the Group on Earth Observations ([GEO](#)): disasters, ecosystems, biodiversity, weather, water, climate, health, and agriculture.
- ❖ Dan Irwin - Head of SERVIR



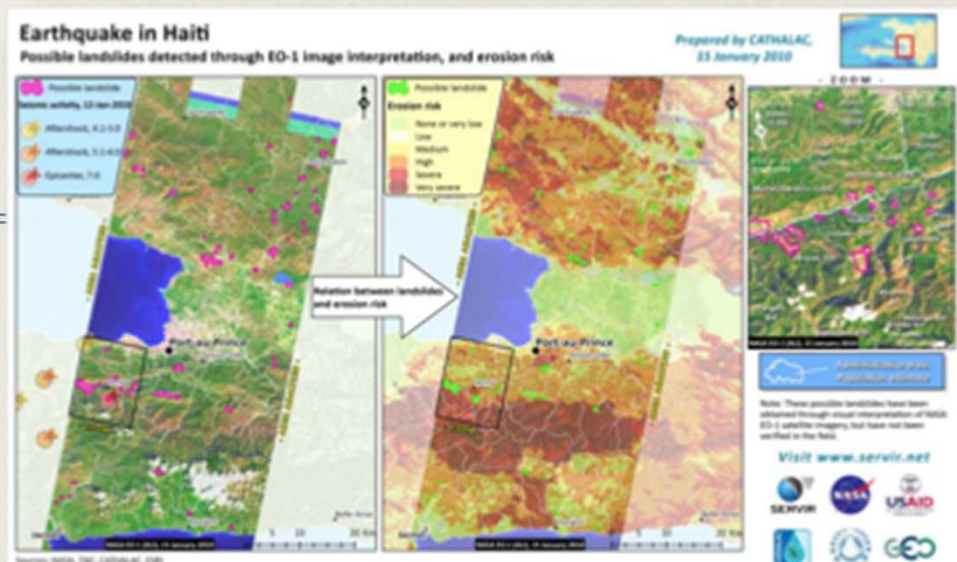
- ❖ Decision makers use SERVIR to improve their ability to monitor air quality, extreme weather, biodiversity, and changes in land cover, and the system has been used over 35 times to respond to environmental threats such as wildfires, floods, landslides, and harmful algal blooms. In addition, SERVIR analyzes, provides information about, and offers adaptation strategies for nations affected by climate change. In a very real sense, SERVIR provides basic information for living on planet Earth.
- ❖ Works hand-in-hand with the State Department USAID program
- ❖ http://www.nasa.gov/mission_pages/servir/index.html



Flood Forecasting in Africa



Mapping Fires in Guatemala Mexico



Earthquake in Haiti



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- ❖ Short-term Prediction Research and Transition (SPoRT) Center is a NASA project to transition unique observations and research capabilities to the operational weather community to improve short-term forecasts on a regional scale.
 - ❖ Works hand-in-hand with NOAA National Weather Service
 - ❖ <http://weather.msfc.nasa.gov/sport/>
 - ❖ Dr. Gary Jedlovec - Head of SPoRT



Hurricane Sandy “Frankenstorm”

Clear sky yellows: Likely power outages

Dark Blues: Cloud Cover

Experimental VIIRS Blackout
RGB Composite

R=8/31, G=8/31, B=10/31

October 31, 2012



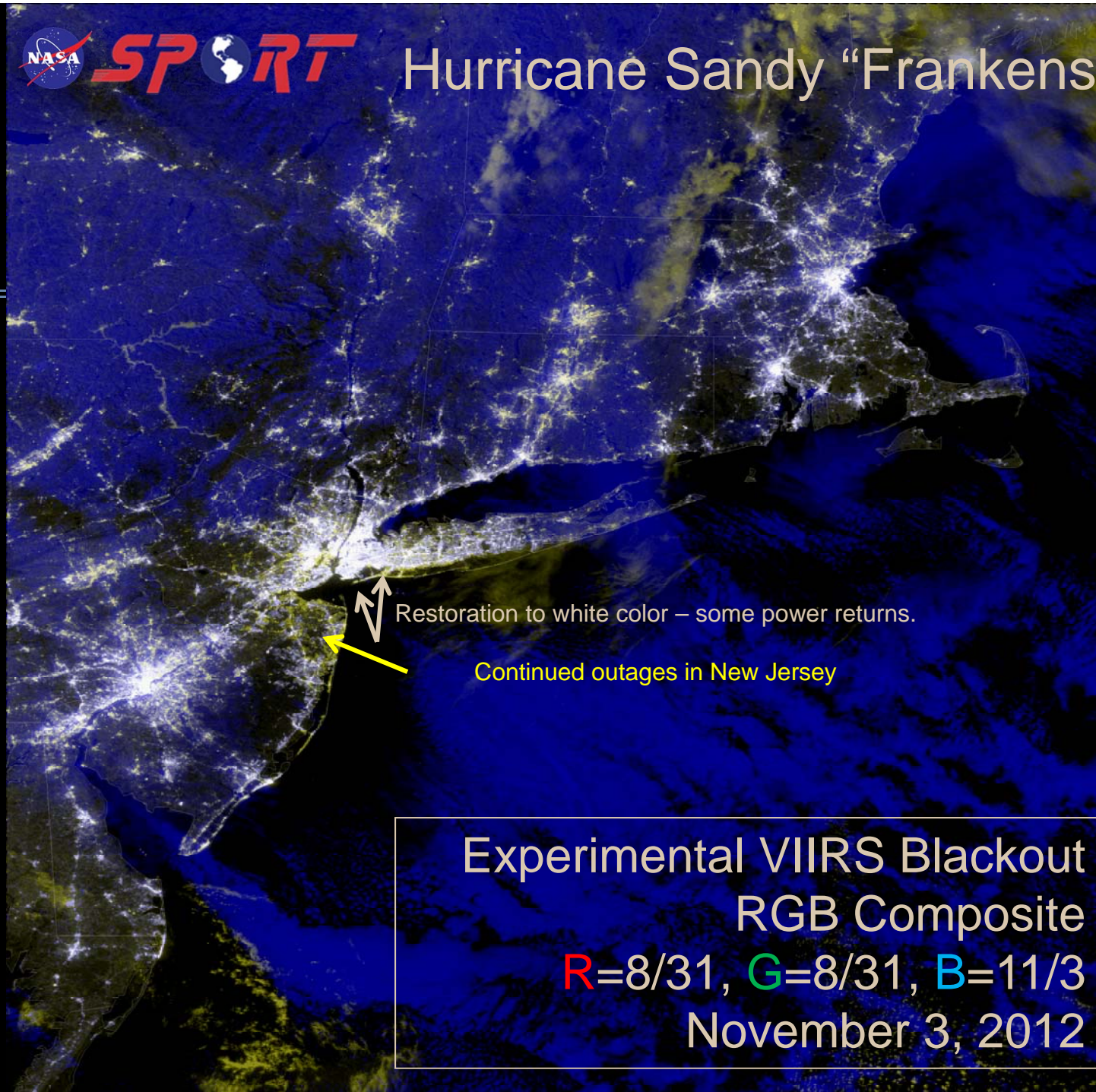
Hurricane Sandy “Frankenstorm”

Clear sky yellows: Likely power outages
Detection of outages in Lower Manhattan, Long Island, NJ

Experimental VIIRS Blackout
RGB Composite
R=8/31, **G**=8/31, **B**=11/1
November 1, 2012



Hurricane Sandy “Frankenstorm”



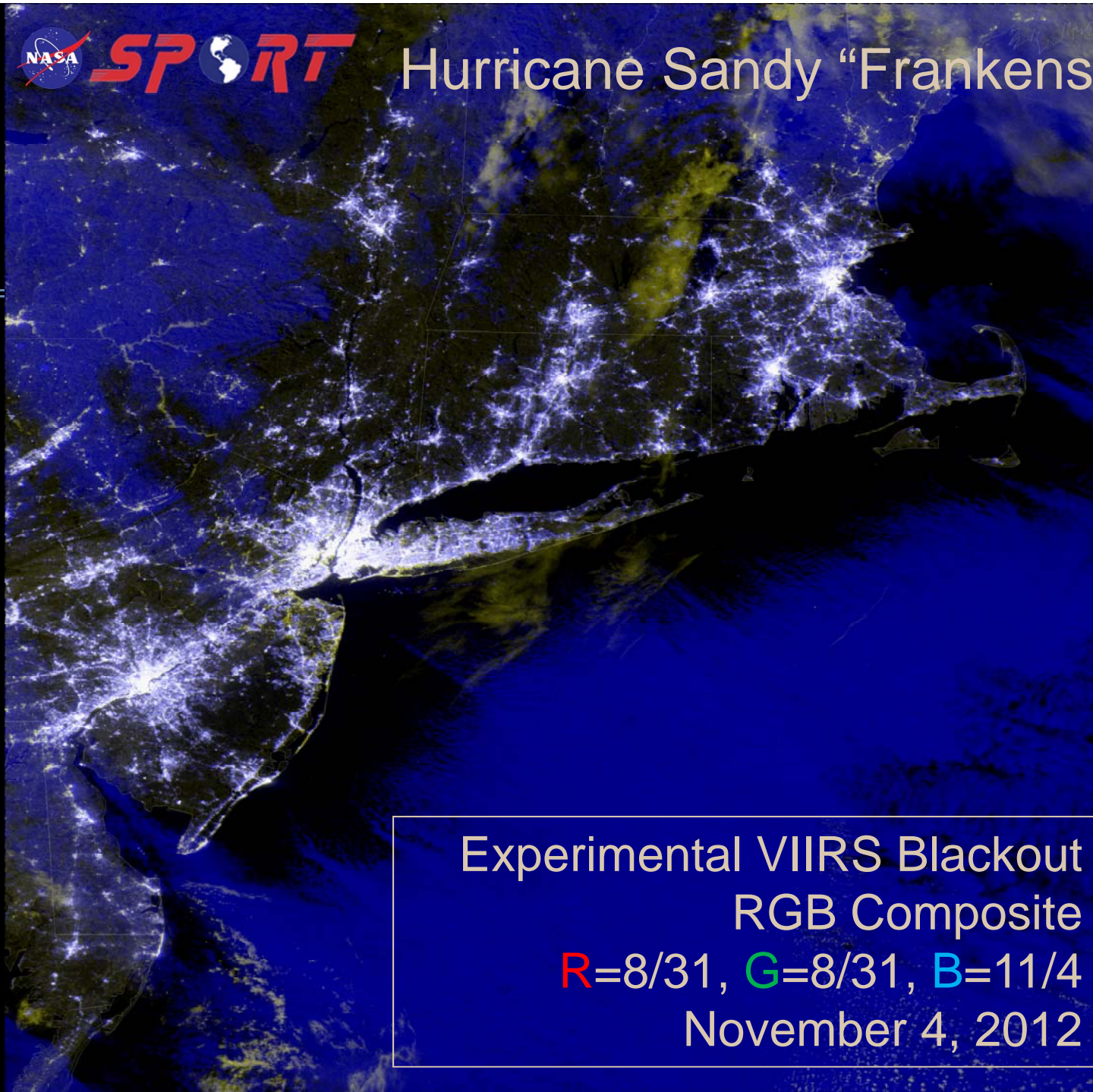
↕ Restoration to white color – some power returns.

Continued outages in New Jersey

Experimental VIIRS Blackout
RGB Composite
R=8/31, **G**=8/31, **B**=11/3
November 3, 2012



Hurricane Sandy "Frankenstorm"



Experimental VIIRS Blackout
RGB Composite
R=8/31, **G**=8/31, **B**=11/4
November 4, 2012



Hurricane Sandy “Frankenstorm”

Much of the major outages restored –
remaining outages may be below the satellite resolution.

Experimental VIIRS Blackout
RGB Composite
R=8/31, **G**=8/31, **B**=11/6
November 6, 2012

Commitment

- ❖ Nothing happens overnight
- ❖ There has to be a commitment on both sides:
 - ❖ research/operations
 - ❖ science/applications
 - ❖ provider/user
- ❖ Commitment must exist at all levels; from management down to implementer and user
- ❖ End-User engagement from the beginning is important

Culture

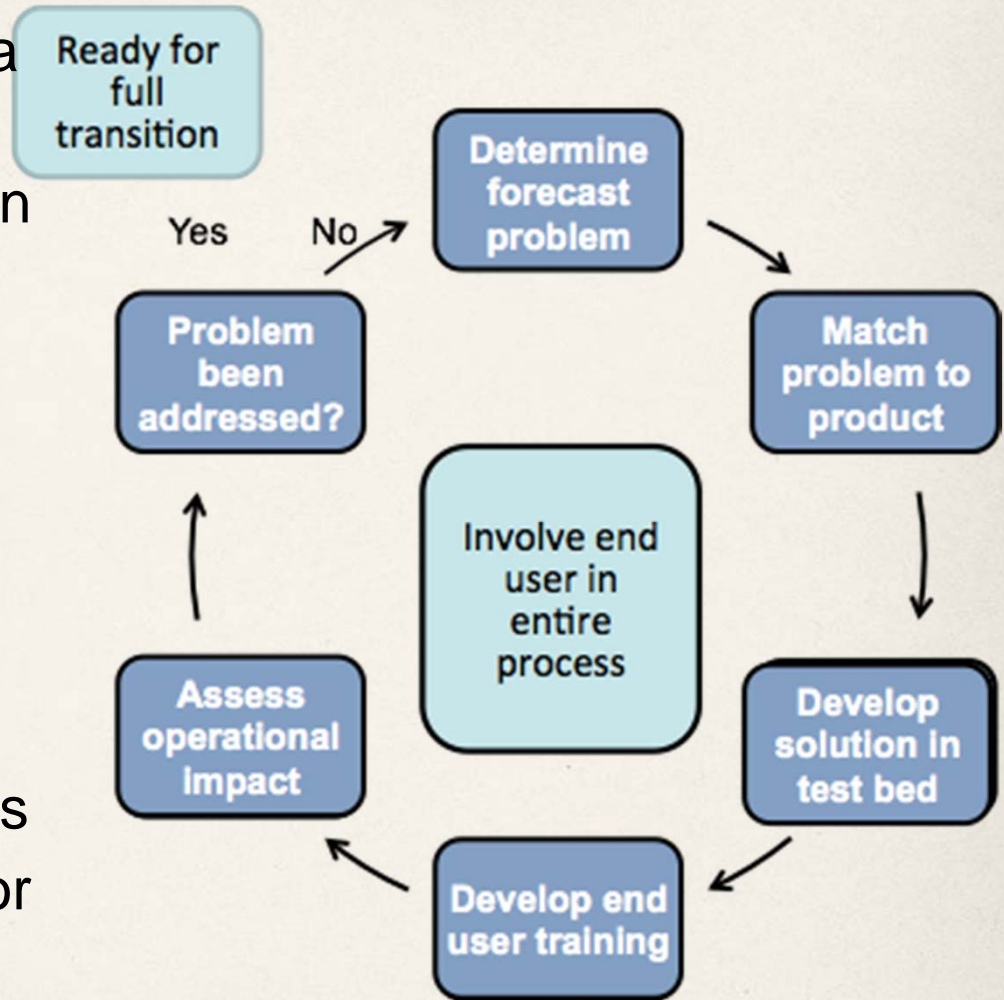
- ✧ The provider and user exist in very different cultures
 - ✧ Provider (researcher)
 - ✧ focuses on detail, perfection
 - ✧ how things work
 - ✧ scientific method
 - ✧ User
 - ✧ just want it to work
 - ✧ doesn't care about some of the details
- ✧ The researcher must live in the user world long enough to understand it - not the other way around

Clarity

- ❖ Clearly identify the needs and requirements
- ❖ Reassess needs and requirements on a frequent and regular basis
- ❖ Identify conditions of satisfaction for the end user
- ❖ Involve the user in the entire process
- ❖ The user must have some investment in the product in order for them to eventually own it

SPoRT Cycle

- ❖ match forecast challenge to data or product
- ❖ develop solution / demonstrate in “test bed” environment
- ❖ integrate successful products into end user’s decision support tools
- ❖ create product training
- ❖ perform product assessment
- ❖ Maintain interactive partnership with end user throughout process
- ❖ Need local end user advocate for product
- ❖ Endorsement from all levels of end user organization



Reality Check

- ❖ Just because we (i.e. researchers) have provided a great product, the user will adjust to it - **NOT**
- ❖ Often user does not have the resources to receive and ingest the product
- ❖ In the cases of SERVIR and SPoRT, USAID and NWS provide capacity to the receiver to ingest the product
- ❖ Recognize and understand the difference between research, building tools, and transition process
- ❖ Must be intentional to successfully transition – not a weekend activity

Conclusion

- ❖ We have a lot to learn from our Earth Science colleagues
- ❖ They have been at this much longer than we have
- ❖ But we have a future
- ❖ This is an area of growth in the discipline because it brings a new dimension, an applied dimension
- ❖ Transitioning must be **intentional** and be able to stand on its own